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Assessment of Nutritional Status AmongPrimary School Pupils in Rural and Urban Areas of Anambra State

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Abstract: Background: Malnutrition is a common problem in Sub-Saharan Nigeria. The untoward effects of malnutrition on children cannot be overemphasized. There is need for studies to understand the dynamics of malnutrition in order to intervene appropriately. Nutritional assessment in the community is essential for accurate planning and implementation of intervention programmes to reduce mortality and morbidity associated with malnutrition. Objectives: This study was carried out to assess the nutritional status of primary school pupils in urban and rural areas of Anambra state, compare them and find out the factors that affect their nutritional status. Methodology: A cross sectional comparative study of 365 children selected by stratified random sampling method from primary schools in both urban and rural areas of Anambra state was carried out. Their nutritional status was determined using anthropometric measures. The socioeconomic and socio demographic variables of interest were analyzed to determine their association with malnutrition in the children. Results: Three hundred and sixty five pupils participated in the study. Among the pupils 181 were in the rural area while 184 were in the urban area. The overall prevalence of underweight, stunting and overweight were 10.7%, 1.9% and 4.1% respectively. Prevalence of underweight was higher in the rural area (18.8%) than in the urban area (2.7%) and the difference was statistically significant. The prevalence of stunting was higher in the rural area (3.3%) than in the urban area (0.5%) and the difference was statistically significant. Underweight was more among the pupils whose parents had low educational level than among those whose parents had higher educational level, and the difference was statistically significant. Conclusion: Malnutrition is higher in the rural areas than the urban areas in Anambra state. Low level of education of parents predisposes children to malnutrition.

Keywords: Nutritional Status, Primary School Pupils, Urban and Rural

1. Introduction

School age is a dynamic period of physical growth and mental development of a child. The World Health Organization(WHO) states that nutritional deficiencies and poor health in primary school age children are among the causes of low school enrolment, high school absenteeism, early dropout from school and poor classroom performance.[(1)]Nutritional assessment in the community is essential for accurate planning and implementation of intervention programmes to reduce mortality and morbidity associated with malnutrition.[(2)] In India,National family health survey data shows that 53% of children in rural areas are underweight and this varies across states.[(3)]This is not different from the unsatisfactory health and nutritional status of the children in Nigeria currently,as in the work carried out in Ile Ife Central LGA in which 70.5% of children in rural areas were underweight as compared to their urban counterpart which were 2.2%.[(4)]

Nutritional status is the current body status of a person or a population group, related to their state of nourishment (the consumption and utilization of nutrients). This is determined

by a complex interaction between internal/constitutional factors and external/environmental factors. Some of these internal factors include age, sex, nutrition, behaviour, physical activity and diseases while the external factors include food safety, cultural, social and economic circumstances. There is increased risk of malnutrition than over-nutrition in children from poor socioeconomic families where the nutrition intake is reduced.[2] Some disease conditions can also cause reduced absorption of nutrients in the body leading to malnutrition.[5] Some methods of assessment of nutritional status include anthropometric measurement,biochemical or laboratory tests, dietary assessment and clinical assessment. Body mass index is a global measure of nutritional status. It illustrates the differences between the sensitivity and specificity of the technique. It provides more accurate results than other methods.[5]There is need to assess the nutritional status of children in rural and urban. This is becausenutritional status is an important indicator in the progression of child's development and growth.Though works has been done on nutritional status of children in Anambra state, they were on secondary school children. The aim of this study was to assess the nutritional status of primary school children in urban and rural communities of Anambra state.

2. Methodology

It was conducted in Anambra State. Anambra state is in the south-eastern part of Nigeria. It is the 8th most populated in Nigeria and 2nd most densely populated after Lagos. It has 21 Local Government Areas (7 urban areas and 14 rural). The urban LGAs include: Nnewi-North, Awka-South, Onitsha-North, Ihiala, Idemili-North, Aguata, Orumba-South. The rural LGAs include: Awka-North, Anambra-East, Anambra-West, Anaocha, Ayamelum, Dunukofia, Ekwusigo, Idemili-South, Njikoka, Nnewi-South, Ogbaru, Onitsha-South and Orumba-North.

This wasa cross-sectional comparative study.The study population comprised of all primary school pupils in urban and rural areas of Anambra State.

The sample size was calculated using the formula for calculation of sample size in a comparative study[6]:

$$n = \frac{2z^2 pq}{d^2}$$

n=The desired sample size

z =The standard normal deviate at 95% confidence interval = 1.96.

P=The proportion in the target population estimated to have a particular characteristic. Prevalence of malnutrition in a study in Sagamu=39.4%.[7] Therefore P=0.39

q =1.0-P = 0.61.

d =Degree of accuracy desired, set at 0.10 for comparative study.

$$n = \frac{2(1.96)^2 \times 0.39 \times 0.61}{0.10^2} = 182.78 = 183 \text{ pupils.}$$

n =181 in rural area

n=184 in urban area

There are six levels in a primary school so to get the number per class, 181pupils in rural areawere divided by 12 making it 16 pupilsper level and 184 pupils in urban areas were also divided by 12 making it 16 pupils per level..

Multistage Sampling technique was used. Stage 1: The schools were stratified into rural and urban. Stage 2: Simple Random Sampling was used to select one rural and one urban area. Stage 3: Stratified sampling was used: the primary schools were divided into public and private schools. Stage 4: Simple Random Sampling was used to selectone public and one private school per Local Government Area. Stage 5: Sixteen participants were taken per class. Data was collected using a semi-structured questionnaire.

Data collected was analysed using Statistical Package for Social Sciences (SPSS) version 20.

The results were presented using tables and charts. Chi square was used for to test for associations. P value of <0.05 was considered significant.Permission for this study was obtained from Nnamdi Azikiwe University Teaching Hospital Ethical Committee. Written informed consent was obtained from the parents of the pupils and assent was obtained from the pupils.

3. Results

Table 1. *Socio-demographic status of the pupils.*

Variables	Frequency	Percentage
Age(yrs)		
<5	6	1.6%
6-10	250	68.5%
11-14	107	29.3%
≥15	2	0.5%
Sex		
Male	184	50.4%
Female	181	49.6%
Present class in school		
Primary 1	56	15.3%
Primary 2	61	16.71%
Primary 3	63	17.3%
Primary4	70	19.2%
Primary 5	54	14.8%
Primary 6	61	16.7%
School		
Private	181	50.4
Public	184	50.4
Residents		
Urban	184	50.4%
Rural	181	49.6%
Mothers highest level of education		
None	16	4.4%
Primary	15.5	42.5%
Secondary	138	37.8%
Tertiary	55	15.1%
Deceased	1	0.3%
Mother's occupation		
Civil servant	60	16.4%
Trader/business woman	218	59.7%
Self employed professional	11	3.0%
Clergy	1	0.3%
House wife	15	4.1%

Variables	Frequency	Percentage
Others	52	14.2%
Artisan	6	1.6%
Deceased	1	0.3%
Unemployed	1	0.3%
Father's highest level of education		
None	16	4.4%
Primary	152	41.6%
Secondary	148	40.5%
Tertiary	42	11.5%
Deceased	7	1.9%
Father's occupation		
Unemployed	1	0.3%
Civil servant	35	9.6%
Trader/business man	142	38.9%
Self employed professional	16	4.4%
Clergy	9	2.5%
Others	95	26.0%
Deceased	9	2.5%

Table 1 shows the socio-demographic characteristics of the pupils. There were a total number of 365 pupils and their ages ranged between 4-15yrs. 65.5% were aged between 6-10 years, 29.3% were aged 11-14years, 1.6% were aged<5 years and 0.5% were ≥15years. The mean age was 9.3± 2.2 years (mean±SD)

Out of 365pupils, 50.4% were males and 49.6% were females.

Table 2. *Nutritional status of the children.*

Variables	Frequency	Percentage
Weight for age		
Normal weight	311	85.2%
Underweight	31	10.7%
Overweight	15	4.1%
Height for age		
Normal height	327	89.6%
Stunted	7	1.9%
Above normal	31	8.5%

Table 2 shows the weight for age and height for age of the pupils in the school and their frequencies. Normal weight represents those that fall between 3rd and 97th percentile while underweight are for those that fall in the category of less than 3rd percentile while overweight are those pupils above 97th percentile while stunted represents those below the 3rd percentile and above normal represents those above 97th percentile.

Table 3. *Distribution of weight for age of the pupils by place of residence.*

	Urban		Rural	
Variable	Frequency	Percentage	Frequency	Percentage
Weight for age				
Normal weight	167	90.8%	144	79.6%
Underweight	5	2.7%	34	18.8%
Overweight	12	6.5%	3	1.7%
Total	184	100%	181	100%

Table 3 shows the distribution of weight for age of the pupils. Out of 184 pupils in urban areas, 90.8%(167) were found to have normal weight, 2.7%(5) were found to be underweight and 6.5%(12) were found to be overweight.Out of 181 pupils in rural areas, 79%(144) were found to have normal weight, 18.8%(34) were found to be underweight and 1.71%(3) were found to be overweight.

Table 4. *Cross tabulation of weight for age of the pupils by their place of residence.*

	Place of residence				
Weight for age.	UrbanN=184n=(%)	RuralN=181n=(%)	TotalN=365n=(%)	X^2	P-value
Normal weight	167(90.8%)	144(79.6%)	311(85.2%)	28.642	0.00
Underweight	5(2.7%)	34(18.8%)	39(10.7%)		
Overweight	12(6.5%)	3(1.7)	15(4.1%)		

Table 4 shows a cross tabulation of the weight for age of the pupils by their place of residence. There was a statistically significant association between their weight for age and their place of residence (X^2 = 28.642, P = 0 .00).

Table 5. *Distribution of height for age of the pupils by their place of residence.*

	Urban			Rural	
Height for age	Frequency	Percentage	Height for age	Frequency	Percentage
Normal height	160	87.0%	Normal height	167	92.3%
Stunted	1	0.5%	Stunted	6	3.3%
Above normal	23	12.5%	Above normal	8	4.4%
Total	184	100%	Total	181	100%

Table 5 shows the distribution of the height for age of the pupils by their place of residence. Out of 184 pupils in urban area,87.0 %(160) had normal height, 0.5%(1) were stunted and 12.5%(23) were too tall for age.Out of 181 pupils in the

rural areas, 92.3%(167) had normal height, 3.3%(6) were stunted and 4.4%(8) were too small.

Table 6. *Cross tabulation of height for age of the pupils by their place of residence.*

Height for age	residents				
	UrbanN=184n=(%)	RuralN=184n=(%)	TotalN=36.5n=(%)	X^2	P-value
Normal height	160(87.0%)	167(92.3%)	327(89.6%)	10.955	0.004
Stunted for age	1(0.5%	6(3.3)	7(1.9)		
Above normal	23(12.5)	8(4.4%)	31(8.5%)		

Table 6 shows cross tabulation of the height for age of the pupils with their place of residence. There was a statistically significant association between their height for age and their place of residence ($X^2 = 10.955$, $p = 0.004$).

Table 7. *Cross tabulation of mothers' highest level of education and mothers' occupation by the weight for age.*

Variable	Frequency				X^2	p-value
	Weight for age					
	Normal weight	Under weight	Overweight	Total		
Mother's highest level of education					38.876	0.000
None	13	2	1	16		
Primary	125	27	3	155		
Secondary	125	10	3	138		
Tertiary	47	0	8	55		
Dead	1	0	0	1		
Mothers' Occupation						
Civil servant	48	4	8	57	43.668	0.000
Trader/business woman	184	29	5	218		
Self employed professional	10	0	1	11		
Clergy	1	0	0	1		
Housewife	12	2	1	15		
Others	48	4	0	52		
Artisan	6	0	0	6		
Unemployed	1	0	0	1		
Deceased	1	0	0	1		

Table 7 shows cross tabulation between the mothers' highest level of education by the pupils' weight for age. There was a statistically significant association between the mothers' educational level and the pupils weight for age (x^2=38.876, p = 0.00). Also there was a statistically significant association between the mothers' occupation and the weight for age of the pupils ($x^2 = 43.668$, $p = 0$ .00).

Table 8. *Cross tabulation of fathers' highest level of education and fathers' occupation by weight for age of the pupils.*

Variables	Frequency				X^2	p-value
	Weight for age					
Father's highest level of education	Normal weight	Underweight	Overweight	Total		
None	12	2	2	16	28.361	0.000
Primary	123	26	3	152		
Secondary	135	8	5	148		
Tertiary	36	1	5	42		
Deceased	5	2	0	7		
Father's occupation						
Civil servant	29	5	1	35	24.274	0.146
Trader/businessman	12502	10	10	142		
Self employed	167	0	0	16		
Clergy	9	0	0	9		
Others	77	18	0	95		
Artisan	50	4	4	58		
Deceased	7	2	0	9		

Table 8 shows Cross tabulation of fathers' highest level of education by weight for age of the pupils. There was a statistically significant association between their fathers' educational level and their weight for age (x^2 =28.361, p = 0.00).Also there was no association between the fathers' occupation and weight for age of the pupils (x^2= 24.274, p = 0.146).

4. Discussion

In this study 10.7% of the pupils were underweight. This is less than the national average of 18% according to the 2013 National Demographic and Health Study (NDHS).[8] Also a higher prevalence of underweight (25.4%) was reported in

Uyo Nigeria.[9] Worse still 51.7% of the school children in Ogun state were underweight.[10]

In this study 1.9% of the pupils were stunted. This is far less than 17.1% reported in Uyo, Nigeria[9] and 48.6% reported in Ogun state, Nigeria.[10] These differences may be due to the socioeconomic levels of the parents of the pupils in the different environments.

In this study, the proportion of the pupils that were underweight was higher in the rural (18.8%) compared with the urban (2.7%) and this was statistically significant. In a study in Ife, Nigeria, the prevalence of underweight among the rural pupils was 70.5% while the prevalence of underweight among the urban pupils was 52.2%.Interestingly the difference was also statistically significant just like in our study.[2]

In this study the prevalence of stunting among the rural pupils was 3.3% while the prevalence among the urban pupils was 0.5% and this difference was statistically significant. Higher rates of stunting (35.8% among the rural pupils and 19.8% among the urban pupils) were reported in Ife and there was also a statistically significant difference.[2]

In this study underweight was more among the pupils whose mothers have less education and mothers' educational level had a statistically significant association with weight for age. A study done in Qatar also reported a higher rate of underweight among the children whose mothers had lower educational level, and the difference was statistically significant.[11] Also the fathers' level of education had a statistically significant associationwith the weight for age of the pupils and underweight was commoner among the pupils whose fathers have lower educational level. This was similar to the finding of a study in Qatar which reported that underweight was higher among pupils whose fathers had lower educational level and the difference was statistically significant.[11]

In conclusion this study has shown that malnutrition is still a problem in Anambra state both in the rural and the urban areas. However it is more in the rural areas. Also low level of mother's and father's education predisposes to malnutrition.

We therefore recommend that the government should channel the interventions to reduce malnutrition to the rural areas. For example the daily school meal program should be concentrated more in the rural areas. Also health education of parents and caregivers should be channelled to the rural areas.

We also want to caution that this study has the limitation of being conducted among school pupils, making it more difficult to apply the findings to out of school children. It is therefore recommended that further studies in the communities and households should be conducted.

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